

**System and Method for Providing Caller Information
Across Heterogeneous Networks**

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BACKGROUND OF THE INVENTION

1. Technical Field

5 The present invention relates in general to a system and method for providing caller information across heterogeneous networks. More particularly, the present invention relates to a system and method for providing caller attributes to a call recipient over a computer
10 network in order for the call recipient to effectively process the telephone call.

2. Description of the Related Art

Caller identification (caller ID) became possible with the implementation of Signaling System 7 (SS7) and is a
15 technique to include a caller's telephone number in a telephone call to a call recipient. SS7 provides a signaling backbone for the Public Switched Telephone Network (PSTN) which transfers call information from one central office to another central office. With the
20 implementation of SS7, it became practical to forward a caller's telephone number through the SS7 network to a central office serving a call recipient (i.e. terminating central office).

A terminating central office receives a caller's phone
25 number, and embeds the phone number in a telephone call to the call recipient between the first and second ring of the telephone call. In some instances, a name associated with the initiating calling number is included in the

transmission message. The information is sent in one of two formats which are a Single Data Message Format (SDMF) and a Multiple Data Message Format (MDMF). The SDMF includes the date, time, and a caller's telephone number.

5 The MDMF includes the date, time, caller's telephone number, and a name associated with the caller's telephone number.

Caller ID, however, includes limited information pertaining to a caller. A challenge found is that in order 10 for a call recipient to retrieve more information corresponding to a caller, the call recipient must have access to a local database that includes the caller's customer profile. Many call recipients, however, do not have access to a local database that includes customer 15 profiles. For example, a service repairman may receive a telephone call on his mobile phone from a customer while he is on call. In this example, the service repairman receives the customer's phone number, but does not receive the caller's address which the service repairman needs in 20 order to travel to the customer's residence. Since the service repairman does not have access to a local database, the service repairman is required to ask the customer his address and write the address on paper.

Furthermore, a caller may wish to provide sensitive 25 data to a call recipient in order to avoid entering his information using his telephone. For example, a caller may frequently order merchandise from a mail order catalog in which the caller provides the mail order catalog with his credit card information. In this example, the user may 30 wish to automatically provide the mail order catalog with

his credit card information when the caller places a telephone call to the mail order catalog. A challenge found, however, is that caller ID does not provide a way for a caller to authorize a call recipient to receive the
5 caller's sensitive data.

What is needed, therefore, is a system and method to provide valid caller information to a call recipient based upon a call recipient's request and a caller's authorization preferences.

SUMMARY

It has been discovered that the aforementioned challenges are resolved by using a name resolution adapter to access caller attributes from a centralized storage area, and provide the caller attributes to a call recipient over a computer network based upon a call recipient contract agreement and initiating caller authorization entries.

A caller places a telephone call to a call recipient using the Public Switched Telephone Network (PSTN). The caller's central office sends the telephone call to a terminating central office over a synchronous optical network (SONET). In addition, the caller's central office sends the caller's telephone number to the terminating central office over SS7. The terminating central office receives the caller's telephone number, and sends a message to a name resolution adapter. The message includes the caller's telephone number as well as the call recipient's telephone number. The name resolution adapter uses the call recipient's telephone number to look-up contract agreement information which includes caller fields that the call recipient wishes to receive. For example, a name resolution adapter service provider may have an agreement with a call recipient whereby the call recipient wishes to receive a caller's address with each incoming telephone call. In this example, the call recipient may use the caller's address to route the telephone call to a company's retail store that is nearest to the caller's address.

The name resolution adapter identifies caller fields corresponding to the call recipient's contract agreement.

If one of the caller fields includes a request for sensitive caller data, such as a credit card number, the name resolution adapter verifies that the call recipient is authorized to receive the sensitive caller data. For 5 example, a caller may authorize a mail order catalog to receive the caller's credit card information in order to avoid the caller from providing the credit card information each time the caller calls the mail order catalog.

The name resolution adapter includes the caller fields 10 in a request to a service control point (SCP) which, in turn, retrieves caller attributes corresponding to the caller fields from a line information database (LIDB). The LIDB is included in the PSTN and is managed by one or more telephone companies. The service control point provides 15 the caller attributes to the name resolution adapter. The name resolution adapter includes the caller attributes in a message, and sends the message to the call recipient over a computer network, such as a TCP/IP network. The call recipient correlates the caller attributes it receives from 20 the computer network with the telephone call it receives from the PSTN.

The foregoing is a summary and thus contains, by necessity, simplifications, generalizations, and omissions of detail; consequently, those skilled in the art will 25 appreciate that the summary is illustrative only and is not intended to be in any way limiting. Other aspects, inventive features, and advantages of the present invention, as defined solely by the claims, will become apparent in the non-limiting detailed description set forth 30 below.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention may be better understood, and its numerous objects, features, and advantages made apparent to those skilled in the art by referencing the accompanying drawings. The use of the same reference symbols in different drawings indicates similar or identical items.

Figure 1 is a diagram showing a call recipient's central office including an initiating caller's identification in a telephone call, and sending the initiating caller's identification to a call recipient;

Figure 2 is a diagram showing a name resolution adapter (NRA) providing caller attribute information to an enterprise application whereby the caller attribute information corresponds to an initiating caller;

Figure 3A is a line information database (LIDB) look-up table that includes caller attributes that correspond to an initiating caller's telephone number;

Figure 3B is an initiating caller authorization look-up table that includes sensitive caller authorizations corresponding to call recipients;

Figure 4 is a diagram showing high-level functional blocks that are included in a name resolution adapter (NRA);

Figure 5 is a high-level flowchart showing steps taken in a name resolution adapter (NRA) receiving initiating caller attributes from a service control point, and sending the caller attributes to an enterprise application (EA);

Figure 6 is a flowchart showing steps taken in a name resolution adapter (NRA) generating a line information database (LIDB) request based upon a call recipient contract agreement and initiating caller authorization agreements;

Figure 7 is a flowchart showing steps taken in an initiating caller configuring authorization entries that authorize call recipients to receive sensitive caller data;

Figure 8 is a flowchart showing steps taken in an enterprise application (EA) processing a call using caller attributes it receives from a name resolution adapter (NRA);

Figure 9 is a flowchart showing steps taken in an enterprise application validating a message that corresponds to an incoming call;

Figure 10 is a flowchart showing steps taken in an enterprise application processing a call; and

Figure 11 is a block diagram of an information handling system capable of implementing the present invention.

DETAILED DESCRIPTION

The following is intended to provide a detailed description of an example of the invention and should not be taken to be limiting of the invention itself. Rather, any number of variations may fall within the scope of the invention which is defined in the claims following the description.

Figure 1 is a diagram showing a call recipient's central office including an initiating caller's identification in a telephone call, and sending the initiating caller's identification to a call recipient. Public switched telephone network (PSTN) **100** includes central offices **120** and **140**. Central offices are typically geographically located, such as in a neighborhood or in a business park, and include a "switch" that manages calls to individual customer telephones. Central office **120** includes switch **125** which routes calls to and from initiating caller **105**. Central office **140** includes switch **145** which routes calls to and from enterprise application **190**. PSTN **100** also includes signaling system 7 (SS7) **135** which is the signaling backbone of PSTN **100** in that SS7 passes caller information between central offices.

Initiating caller **105** uses PSTN **100** to place a telephone call to a recipient caller, such as enterprise application **190**. Enterprise application **190** is a telephone system that supports multiple phone lines. For example, initiating caller **105** may wish to call a computer manufacturer's help desk for assistance with configuring his computer.

Initiating caller **105** sends call **110** to central office **120**. Central office **120** includes switch **125** which receives call **110**. Central office **120** performs two functions with call **110**. Its first function is to identify a destination central office that corresponds to call **110**. Central office **120** identifies that call **110** corresponds to a telephone that central office **140** supports. Central office **120** sends call **110** to central office **140** over synchronous optical network (SONET) **128**. Central office **120**'s second function is to send initiating caller **105**'s telephone number (e.g. caller number **130**) to central office **140** through signaling system 7 **135**.

Central office **140** receives and correlates caller number **130** with call **110**. Central office **140** then sends a request (e.g. request **150**) to service control point **160** for a name that corresponds to caller number **130**. Service control point **160** retrieves caller name **175** from line information database (LIDB) store **170**, and sends caller name **175** to central office **140**. Central office **140** includes caller name **175** and caller number **130** in caller identification **180**, and sends caller identification **180** with call **110** to enterprise application **190** over a destination subscriber loop between the first and second ring by means of two modem tones. Caller ID **180** is transmitted serially in FSK mode using either a Single Data Message Format (SDMF) or a Multiple Data Message Format (MDMF). The SDMF includes the date, time, and calling number. The MDMF includes the date, time, calling number, and the name associated with the calling number. Enterprise application **190** uses caller ID **180** to retrieve caller profile information from profile store **195**. Profile

store **195** may be stored on a nonvolatile storage area, such as a computer hard drive.

Figure 2 is a diagram showing a name resolution adapter (NRA) providing caller attribute information to an enterprise application whereby the caller attribute information corresponds to an initiating caller. **Figure 2** is similar to **Figure 1** with regards to sending a call (e.g. call **110**) from initiating caller **105** to enterprise application **190**. However, **Figure 2** is different than **Figure 1** with regards to providing caller information to enterprise application **190**. The diagram in **Figure 2** shows a name resolution adapter retrieving caller attributes, such as name, address, and billing information, and sending the caller attributes to enterprise application **190** over computer network **250**, such as a TCP/IP network.

Central office **140** receives caller number **130** from SS7 **135**, and sends message **210** to name resolution adapter **200**. Message **210** includes caller number **130** as well as the call recipient's (e.g. enterprise application **190**) phone number. Name resolution adapter **200** uses the call recipient's phone number to look-up contract agreement information that is located in contract store **215**. A call recipient sends an agreement request to name resolution adapter **200** in order to establish a contract agreement. For example, enterprise application **190** may have a contract agreement with a name resolution adapter service provider whereby enterprise application **190** requests a name and an address that corresponds with each incoming call. In this example, enterprise application **190** may use an initiating caller's address to route a particular phone call to a company's retail store that is closest to the initiating caller's

address. Contract store **215** may be stored on a nonvolatile storage area, such as a computer hard drive.

Name resolution adapter **200** identifies requested caller fields corresponding to enterprise application **190**'s contract agreement, and includes the requested caller fields in a request (e.g. request **220**) to service control point (SCP) **160**. Service control point **160** receives request **220**, and retrieves caller attributes corresponding to the requested caller fields (e.g. caller attributes **230**) from line information database **170**. Service control point **160** sends caller attributes **230** to name resolution adapter **200**.

Name resolution adapter **200** includes caller attributes **230** in a message as well as telephone port location information that identifies which port enterprise application **190** will receive the corresponding call. Name resolution adapter **200** then sends enterprise application message **240** to enterprise application **190** over computer network **250**, such as a TCP/IP network. Enterprise application **190** validates call **110** using enterprise application message **240**. Enterprise application **190** then uses caller attributes **230** to retrieve caller profile information from profile store **195** to process the call (see **Figures 8, 9, 10**, and corresponding text for further details regarding enterprise application call processing). **Figure 2** shows that enterprise application **190** receives caller attributes **230** and call **110** over heterogeneous, or dissimilar networks. In an alternative embodiment, name resolution adapter **200** may send the caller attributes to central office **140** which, in turn, sends the caller attributes to enterprise application **190** over a telephone

network that is used to send call 110 to enterprise application 190.

Figure 3A is a line information database (LIDB) look-up table that includes caller attributes that correspond to an initiating caller's telephone number. A service control point accesses table 300 when the service control point receives a request from a name resolution adapter for particular caller information. For example, a name resolution adapter may request an address that corresponds to a particular telephone number (see Figure 2 and corresponding text for further details regarding NRA requests).

Table 300 includes columns 305 through 325. Column 305 includes a list of initiating caller telephone numbers. A service control point uses information in column 305 to match a NRA request with a particular initiating caller entry. Column 310 includes a person's name that corresponds to the telephone numbers included in column 305. Column 315 includes address information that corresponds to initiating caller numbers that are shown in column 305. Information in columns 310 and 315 are the same as information listed in a telephone directory.

Column 320 includes billing information that corresponds to telephone numbers listed in column 305. For example, a person may have his phone bill charged to his credit card whereby the person's credit card information is included in column 320. In this example, a service control point may retrieve billing information from table 300 and provide the billing information to a name resolution adapter which, in turn, sends the billing information to an

enterprise application. In this example, for security purposes, an agreement is in place between the initiating caller and the call recipient that allows the call recipient to receive the initiating caller's billing information. Column **325** includes service preference information corresponding to phone numbers that are included in column **305**, such as call waiting, call forwarding, and three way calling.

Table **300** includes rows **330** through **340** whereby each row includes an initiating caller entry. Row **330** includes caller attributes corresponding to phone number "512-555-1212." The caller attributes include the name "John Doe", the address "800 Anytown Dr.", alternate billing "12324356", and service preferences "call waiting" and "caller id." Row **335** includes caller attributes corresponding to phone number "496-123-4567." The caller attributes include the name "Jane Doe", the address "500 Anystreet", alternate billing "989865447", and service preferences "three way calling." Row **340** includes caller attributes corresponding to phone number "654-987-4321." The caller attributes include the name "Bob Doe", the address "310 Court Ave.", alternate billing "97844675", and service preferences "caller id."

Figure 3B is an initiating caller authorization look-up table that includes sensitive caller authorizations corresponding to call recipients. For example, an initiating caller may wish a mail order catalog to receive the initiating caller's credit card information when the initiating caller places a call to the mail order catalog. In this example, the initiating caller configures an authorization entry at a name resolution adapter service

provider to authorize the name resolution service provider to provide the credit card information to the call recipient.

Table **350** includes columns **360**, **370**, and **375**. Column **360** includes the telephone number of an initiating caller which has configured authorizations corresponding to call recipients (see **Figure 7** and corresponding text for further details regarding call recipient authorization configuration). Column **370** includes call recipient identities (e.g. telephone numbers) that correspond to caller authorizations. As one skilled in the art can appreciate, other call recipient identities may be used to associate a call recipient with a caller authorization, such as the call recipient's name.

Column **375** includes sensitive caller data authorizations corresponding to call recipient identities located in column **370**. Row **380** shows that call recipient "876-543-0989" is authorized to receive "Billing Information" corresponding to initiating caller "512-555-1212." Row **385** shows that call recipient "656-789-6434" is authorized to receive "Birth Date" information corresponding to initiating caller "512-555-1212." And, row **390** shows that call recipient "467-864-2578" is authorized to receive "Social Security Number" information corresponding to initiating caller "512-555-1212."

Figure 4 is a diagram showing high-level functional blocks that are included in a name resolution adapter (NRA). NRA **200** includes PSTN interface **400** which receives message **210** from service termination point **400**. Message **210** includes an initiating caller's number and a call

recipient's number. Message **210** may be formatted in a standard format, such as an Initial Address Message Transaction Capability Application Part (IAM TCAP). PSTN interface **400** passes the initiating caller's phone number 5 and the call recipient's phone number to contract manager **420**. Contract manager **420** looks up contract information corresponding to the call recipient's phone number in contract store **215**. For example, NRA **200** may have a contract agreement with a call recipient to provide an 10 initiating caller's address with each incoming telephone call.

Contract manager **420** retrieves requested caller fields from contract store **215**, and contract manager **420** passes requested caller fields **425** to line information database 15 (LIDB) message manager **430**. LIDB message manager **430** includes requested caller fields **425** in request **220**, and sends request **220** to service control point (SCP) **160**. Request **220** may be formatted in a standard format, such as TCAP. SCP **160** retrieves caller attributes from LIDB store 20 **170**, and sends caller attributes **230** to LIDB message manager **430**. LIDB message manager **430** forwards caller attributes **230** to enterprise application message manager **440**.

Enterprise application message manager **440** includes 25 caller attributes **230** in EA message **240**, along with a telephone port location that identifies the port at which enterprise application **190** receives the corresponding call. Enterprise application message manager then sends EA message **240** to enterprise application **190** over a TCP/IP 30 network connection.

Figure 5 is a high-level flowchart showing steps taken in a name resolution adapter (NRA) receiving initiating caller attributes from a service control point, and sending the caller attributes to an enterprise application (EA).

5 Processing commences at **500**, whereupon the NRA waits for a call from initiating caller **105** through PSTN **100** at step **510**. Initiating caller **105** and PSTN **100** are the same as that shown in **Figure 1**. When the NRA receives a call, the NRA identifies a recipient of initiating caller **105**'s
10 telephone call at step **520**. For example, initiating caller **105** may be calling a company's customer support line.

At step **530**, NRA processing identifies a contract agreement that corresponds to the call recipient, retrieves requested caller fields from contract store **215**, and
15 generates a line information database (LIDB) request using the requested caller fields (pre-defined process block, see **Figure 6** and corresponding text for further details). NRA processing sends the LIDB request to service control point **160** at step **540**. In turn, NRA processing receives caller
20 attributes corresponding to the LIDB request from service control point **160**, and stores the caller attributes in temp store **555** (step **550**).

NRA processing includes the caller attributes received from temporary store **555** and caller fields from contract
25 store **215** in an enterprise application (EA) message at step **560**. Processing sends the EA message to enterprise application **190** through computer network **250** at step **570**. EA application **190** receives the EA message, and associates the caller attributes with initiating caller **105**'s
30 telephone call (see **Figures 2, 8**, and corresponding text

for further details regarding enterprise application call processing).

A determination is made as to whether to continue processing telephone calls (decision **580**). If processing should continue, decision **580** branches to "Yes" branch **582** which loops back to process another call. This looping continues until NRA call processing should stop, at which point decision **580** branches to "No" branch **588** whereupon processing ends at **590**.

Figure 6 is a flowchart showing steps taken in a name resolution adapter (NRA) generating a line information database (LIDB) request based upon a call recipient contract agreement and initiating caller authorization agreements. LIDB request generation processing commences at **600**, whereupon processing identifies at **610** whether the call recipient has a contract agreement with the NRA service provider by accessing a contract look-up table located in contract store **215**. For example, a company may have a contract with an NRA service provider whereby the service provider provides an initiating caller's name and address with each telephone call.

A determination is made as to whether the call recipient has an existing contract agreement (decision **620**). If the call recipient does not have an existing contract agreement, decision **620** branches to "No" branch **622** whereby processing logs call information in log store **628** at step **625**. In one embodiment, the name resolution adapter increments a counter to track the number of times that it receives a message corresponding to a particular call recipient. The name resolution adapter service

provider may use the counter and logged information to show a potential customer the number of calls the potential customer could receive that would include caller attribute information. Log store **628** may be stored on a nonvolatile storage area, such as a computer hard drive. Processing returns at **629**.

On the other hand, if the call recipient has an existing contract agreement with the NRA service provider, decision **620** branches to "Yes" branch **623** whereupon at step **630** processing looks up requested caller fields corresponding to the contract agreement located in contract store **215**. Contract store **215** is the same as that shown in **Figure 2** and may be stored on a nonvolatile storage area, such as a computer hard drive.

At **640**, a determination is made as to whether one or more of the call recipient's requested caller fields correspond to sensitive caller data. For example, a call recipient may request the initiating caller's credit card number. If the call recipient does not request sensitive caller data, decision **640** branches to "No" branch **642** whereupon processing includes each requested caller field in request **220** at step **645**, and processing returns at **650**.

On the other hand, if one or more of the call recipient's requested caller fields corresponds to sensitive caller data, decision **640** branches to "Yes" branch **644** whereupon processing looks up initiating caller authorization agreements in contract store **215** (step **665**). Using the example described above, an initiating caller may authorize the call recipient to authorize the call recipient to receive the initiating caller's credit card

number (see **Figure 3B** and corresponding text for further details regarding initiating caller authorization details).

A determination is made as to whether the initiating caller authorizes the call recipient to receive sensitive 5 caller data (decision **660**). If the call recipient is authorized to receive the initiating caller's sensitive caller data, decision **660** branches to "Yes" branch **662** whereupon processing includes each requested caller field in request **220** (step **645**). On the other hand, if the call 10 recipient is not authorized to receive sensitive caller data, decision **660** branches to "No" branch **668** whereupon processing logs the discrepancy in log store **628** in order to provide the discrepancy information to a call recipient. Processing includes only authorized requested caller fields 15 in request **220** at step **680**, and processing returns at **690**.

Figure 7 is a flowchart showing steps taken in an initiating caller configuring authorization entries that authorize call recipients to receive sensitive caller data. For example, an initiating caller may wish a mail order 20 catalog to receive the initiating caller's credit card information when the initiating caller places a call to the mail order catalog. In this example, the initiating caller configures an authorization entry at a name resolution adapter service provider to authorize the name resolution 25 service provider to provide the credit card information to the call recipient.

Processing commences at **700**, whereupon processing receives an authorization setup request from initiating caller **105** (step **710**). Initiating caller **105** is the same 30 as that shown in **Figure 1**. At step **720**, processing

generates a caller authorization entry in an authorization look-up table stored in contract store **215** (see **Figure 3B** and corresponding text for further details regarding authorization table properties). Contract store **215** is the
5 same as that shown in **Figure 2**.

Processing receives a first call recipient identity from initiating caller **105**, such as the call recipient's phone number, at step **730**, and stores the call recipient's identity in the authorization look-up table located in
10 contract store **215** (step **740**). Processing then receives a first authorization (i.e. credit card authorization) to correspond to the first call recipient identity at step **750**, and stores the first authorization in the authorization look-up table stored in contract store **215**
15 (step **760**).

A determination is made as to whether initiating caller **105** wishes to add more authorizations to correspond to the first call recipient (decision **770**). For example, initiating caller **105** may wish to authorize the first call
20 recipient to receive the initiating caller's social security number. If initiating caller **105** wishes to add more authorizations to correspond to the first call recipient, decision **770** branches to "Yes" branch **772** whereupon processing receives (step **775**) and processes the next authorization to correspond to the first call
25 recipient. This looping continues until initiating caller **105** does not wish to add more authorizations to the first call recipient, at which point decision **770** branches to "No" branch **778** whereupon a determination is made as to
30 whether initiating caller **105** wishes to configure authorizations for additional call recipients (decision

780). If initiating caller wishes to configure authorizations for additional call recipients, decision 780 branches to "Yes" branch 782 whereupon processing receives (step 785) and processes a second call recipient's 5 authorizations. This looping continues until there are no more call recipients to process, at which point decision 780 branches to "No" branch 788 whereupon processing ends at 790.

Figure 8 is a flowchart showing steps taken in an 10 enterprise application (EA) processing a call using caller attributes it receives from a name resolution adapter (NRA). Enterprise application processing commences at 800, whereupon the enterprise application waits for a message 15 from name resolution adapter 200 through computer network 250 (step 810). The message includes one or more customer identifiers, such as caller attributes, and corresponds to a call from an initiating caller. Name resolution adapter 200 and computer network 250 are the same as those shown in Figure 2.

20 The enterprise application validates the call using the caller attributes and also verifies that the call is present on a specified telephone port (pre-defined process block 830, see Figure 9 and corresponding text for further details). For example, a company's customer support 25 telephone system may identify that caller is calling from a long distance telephone based upon caller attributes and decides not to accept the call in order to avoid long distance charges on its 1-800 telephone line.

30 A determination is made as to whether the call corresponding to the message is valid based upon profile attributes (decision 840). If the call is not valid,

decision **840** branches to "No" branch **842** whereupon at step **850** processing sends an error message to name resolution adapter **200** which, in turn, provides the error message to the caller. For example, processing may play a recording 5 to the caller as to which number to dial based upon the caller's address.

On the other hand, if the call is valid, decision **840** branches to "Yes" branch **848** whereupon a determination is made as to whether the telephone port corresponding to the 10 message is receiving a call (decision **860**). If the port corresponding to the message is not receiving an incoming call, decision **860** branches to "No" branch **862** which loops back to log the call discrepancy in unassociated call store **875** (step **870**), and wait for another message. This looping 15 continues until a telephone port corresponding to a message includes an incoming call, at which point decision **860** branches to "Yes" branch **868** whereupon the enterprise application processes the call (pre-defined process block **880**, see **Figure 10** and corresponding text for further 20 details).

A determination is made as to whether to continue processing incoming messages (decision **890**). If processing should continue to process incoming messages, decision **890** branches to "Yes" branch **892** which loops back to process 25 more messages. This looping continues until the enterprise application does not wish to process more incoming messages, at which point decision **890** branches to "No" branch **898** whereupon processing ends at **899**.

Figure 9 is a flowchart showing steps taken in an 30 enterprise application validating a telephone call that corresponds to an incoming message. Processing commences at **900**, whereupon processing extracts caller attributes

from enterprise application message **240** at step **910**. Enterprise message **240** is the same as that shown in **Figure 2**. At step **920**, processing uses the caller attributes, such as the caller's name, to look-up a caller profile in profile store **195**. For example, the enterprise application may support a banking telephone system whereby the enterprise application looks-up the caller's account information. Profile store **195** is the same as that shown in **Figure 1**.

10 A determination is made as to whether to accept the call based upon the caller's profile information (decision **930**). For example, if the caller does not have an account with the bank, the enterprise application may not accept the call. If the enterprise application should not accept 15 the call, decision **930** branches to "No" branch **932** whereupon processing returns an error at **935**. On the other hand, if processing should accept the call, decision **930** branches to "Yes" branch **938** whereupon processing extracts 20 telephone port location information from enterprise application **240** at step **940**. The telephone port location information corresponds to which port (i.e. circuit) the enterprise application should receive the corresponding call.

Processing checks the identified port location for an 25 incoming call at step **950**, and a determination is made as to whether a call is present at the specified port location (decision **960**). If a call is present at the specified port location, decision **960** branches to "Yes" branch **968** whereupon processing returns at **990**. If a call is not 30 present at the specified port location, decision **960** branches to "No" branch **962** whereupon a determination is made as to whether processing should wait for the incoming

call (decision **970**). For example, processing may set a timer for two seconds whereby processing waits for two seconds after it receives a message to look for a corresponding call.

5 If processing should wait for the incoming call, decision **970** branches to "No" branch **972** whereupon processing loops back to check for the corresponding call at the specified port location. This looping continues until processing's timer times out, at which point decision
10 **970** branches to "Yes" branch **978** whereupon processing returns an "unassociated call" at **980**.

Figure 10 is a flowchart showing steps taken in an enterprise application processing a call. Call processing commences at **1000**, whereupon processing retrieves
15 subscriptions corresponding to the caller from subscriptions store **1005** (step **1010**). For example, processing may retrieve a level of service for a caller that permits him to check billing information, but his level of service does not permit him to buy anything.
20 Processing invokes a service corresponding to the service subscriptions at step **1020**. Using the example described above, processing may configure permissions and associate the permissions to the call which allows the caller to check billing information but not buy anything.

25 The enterprise application answers the call at step **1030**, whereupon a determination is made as to whether to validate the caller (decision **1040**). For example, a banking application may require a user to enter a PIN in order to authenticate the user. If processing does not
30 need to validate the caller, decision **1040** branches to "No" branch **1048** bypassing caller validation steps. On the other hand, if processing should validate the caller,

decision **1040** branches to "Yes" branch **1042** whereupon processing requests a PIN from initiating caller **105** at step **1045**. Initiating caller **105** is the same as that shown in **Figure 1**.

5 Processing receives a PIN from initiating caller **105** at step **1050**, and a determination is made as to whether initiating caller **105** entered the correct PIN (decision **1055**). If initiating caller **105** did not enter the correct PIN, decision **1055** branches to "No" branch **1057** whereupon 10 processing plays an error message to initiating caller **105** at step **1060**, and processing returns to receive more calls at **1065** (see **Figure 8** and corresponding text for further details). On the other hand, if initiating caller **105** did enter the correct PIN, decision **1055** branches to "Yes" 15 branch **1059**.

A determination is made as to whether the caller requires special routing to a particular extension (decision **1070**). For example, a caller may have previously spoken to a particular attendant and the enterprise 20 application wishes to route the caller's call to the same attendant. If the call requires special routing, decision **1070** branches to "Yes" branch **1078** whereupon processing forwards the call to a particular number (step **1085**), such as attendant **1090**'s number, and processing returns to 25 receive more calls at **1095** (see **Figure 8** and corresponding text for further details). On the other hand, if the call does not require special routing, decision **1070** branches to "No" branch **1072** whereupon processing routes the call to the next attendant (step **1075**), such as attendant **1080**'s 30 number, and processing returns to receive more calls at **1095** (see **Figure 8** and corresponding text for further details).

Figure 11 illustrates information handling system 1101 which is a simplified example of a computer system capable of performing the computing operations described herein. Computer system 1101 includes processor 1100 which is coupled to host bus 1102. A level two (L2) cache memory 1104 is also coupled to host bus 1102. Host-to-PCI bridge 1106 is coupled to main memory 1108, includes cache memory and main memory control functions, and provides bus control to handle transfers among PCI bus 1110, processor 1100, L2 cache 1104, main memory 1108, and host bus 1102. Main memory 1108 is coupled to Host-to-PCI bridge 1106 as well as host bus 1102. Devices used solely by host processor(s) 1100, such as LAN card 1130, are coupled to PCI bus 1110. Service Processor Interface and ISA Access Pass-through 1112 provides an interface between PCI bus 1110 and PCI bus 1114. In this manner, PCI bus 1114 is insulated from PCI bus 1110. Devices, such as flash memory 1118, are coupled to PCI bus 1114. In one implementation, flash memory 1118 includes BIOS code that incorporates the necessary processor executable code for a variety of low-level system functions and system boot functions.

PCI bus 1114 provides an interface for a variety of devices that are shared by host processor(s) 1100 and Service Processor 1116 including, for example, flash memory 1118. PCI-to-ISA bridge 1135 provides bus control to handle transfers between PCI bus 1114 and ISA bus 1140, universal serial bus (USB) functionality 1145, power management functionality 1155, and can include other functional elements not shown, such as a real-time clock (RTC), DMA control, interrupt support, and system management bus support. Nonvolatile RAM 1120 is attached to ISA Bus 1140. Service Processor 1116 includes JTAG and

I²C busses **1122** for communication with processor(s) **1100** during initialization steps. JTAG/I²C busses **1122** are also coupled to L2 cache **1104**, Host-to-PCI bridge **1106**, and main memory **1108** providing a communications path between the 5 processor, the Service Processor, the L2 cache, the Host-to-PCI bridge, and the main memory. Service Processor **1116** also has access to system power resources for powering down information handling device **1101**.

Peripheral devices and input/output (I/O) devices can 10 be attached to various interfaces (e.g., parallel interface **1162**, serial interface **1164**, keyboard interface **1168**, and mouse interface **1170** coupled to ISA bus **1140**. Alternatively, many I/O devices can be accommodated by a super I/O controller (not shown) attached to ISA bus **1140**.

15 In order to attach computer system **1101** to another computer system to copy files over a network, LAN card **1130** is coupled to PCI bus **1110**. Similarly, to connect computer system **1101** to an ISP to connect to the Internet using a telephone line connection, modem **1175** is connected to 20 serial port **1164** and PCI-to-ISA Bridge **1135**.

While the computer system described in **Figure 11** is capable of executing the processes described herein, this computer system is simply one example of a computer system. Those skilled in the art will appreciate that many other 25 computer system designs are capable of performing the processes described herein.

One of the preferred implementations of the invention is an application, namely, a set of instructions (program code) in a code module which may, for example, be resident 30 in the random access memory of the computer. Until

required by the computer, the set of instructions may be stored in another computer memory, for example, on a hard disk drive, or in removable storage such as an optical disk (for eventual use in a CD ROM) or floppy disk (for eventual 5 use in a floppy disk drive), or downloaded via the Internet or other computer network. Thus, the present invention may be implemented as a computer program product for use in a computer. In addition, although the various methods described are conveniently implemented in a general purpose 10 computer selectively activated or reconfigured by software, one of ordinary skill in the art would also recognize that such methods may be carried out in hardware, in firmware, or in more specialized apparatus constructed to perform the required method steps.

15 While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that, based upon the teachings herein, changes and modifications may be made without departing from this invention and its broader aspects and, therefore, 20 the appended claims are to encompass within their scope all such changes and modifications as are within the true spirit and scope of this invention. Furthermore, it is to be understood that the invention is solely defined by the appended claims. It will be understood by those with skill 25 in the art that if a specific number of an introduced claim element is intended, such intent will be explicitly recited in the claim, and in the absence of such recitation no such limitation is present. For a non-limiting example, as an aid to understanding, the following appended claims contain 30 usage of the introductory phrases "at least one" and "one or more" to introduce claim elements. However, the use of

such phrases should not be construed to imply that the introduction of a claim element by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim element to inventions containing only one 5 such element, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an"; the same holds true for the use in the claims of definite articles.